

2

Chapter

Diversity in the Living World

We'll cover the following key points:

- Diversity in Plants and Animals Around Us
- Plants and Animals in Different Surroundings



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Learning Outcomes

By the end of this chapter, students will be able to:

- Recognize the significance of each living organism and understand the concept of biodiversity.
- Classify plants and animals based on their characters and distinctive features.
- Comprehend the movement patterns in animals and the body structures involved in those movements.
- Discover and analyze examples of plants and animals, focusing on their adaptations to their environment.

Guidelines for Teachers

The educator can introduce this topic by explaining biodiversity and the concept of adaptation. They may highlight the value of plants and animals and engage students in activities such as nature walks and observational recordings. Facilitating active involvement and discussions on their observations will help students develop a deeper appreciation and understanding of nature. The educator should aim to create a dynamic learning atmosphere that motivates students to interact and enhance their learning experience.

NCF Curricular Goals and Competencies

This chapter aligns with the following curricular goals and competencies:

CG-3 (C 3.1, 3.2, and 3.3) investigates the living organisms around us and their relationship with non-living elements through scientific concepts

Introduction

Diversity refers to the vast range of differences and variety that exist among living organisms in a particular area. It encompasses the numerous types of plants, animals, and other living things that inhabit the same region and how they differ from one another in terms of size, shape, color, habitat, behavior, and many other characteristics. This variety is not limited to a single place or ecosystem but extends across forests, oceans, grasslands, deserts, and even urban environments.

This diversity is crucial for the survival of life on Earth as it ensures the stability and functionality of ecosystems. It allows for interdependence between species, such as pollination by insects or seed dispersal by birds, and provides humans with resources like food, medicine, and clean air. Understanding the diversity of plants and

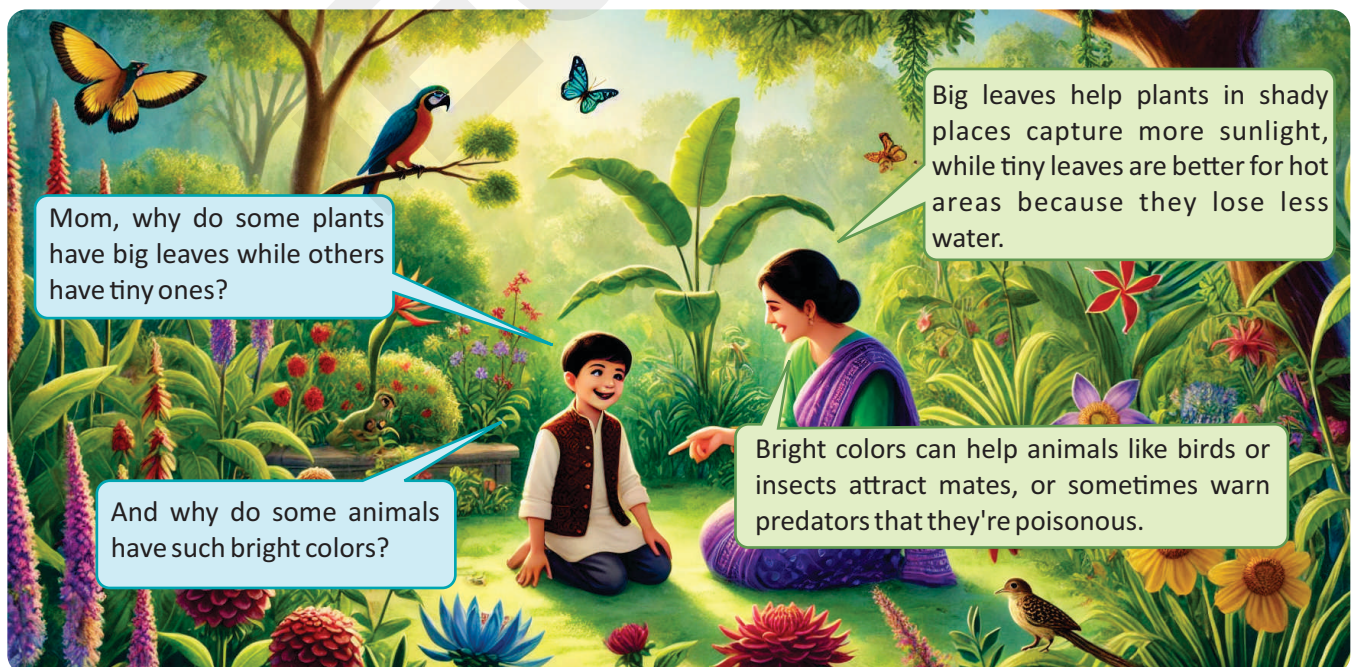
animals helps us appreciate the intricate relationships that sustain life and highlights the importance of conserving these natural treasures for future generations.

In History...

The concept of biodiversity has been recognized for centuries, with ancient civilizations like the Greeks and Indians observing and classifying plants and animals based on their unique traits. Aristotle, often referred to as the "Father of Biology," laid the foundation for the systematic study and classification of living organisms in the 4th century BC. Similarly, ancient Indian texts such as the Rigveda and Ayurveda emphasized the ecological and medicinal importance of various species. In the 18th century, Carl Linnaeus revolutionized the scientific world by introducing binomial nomenclature, a system that standardized the naming of species globally.

Diversity in Plants and Animals Around Us

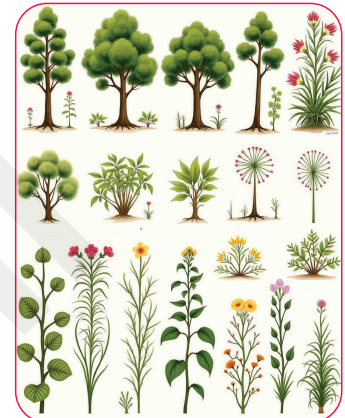
Aarav and Maya are in a garden, surrounded by different plants and animals.



When we talk about diversity in plants and animals around us, we delve into understanding how many distinct types of living organisms coexist in a specific location. For instance, in a garden, we might find flowering plants, trees, shrubs, birds, insects, and small mammals, each playing its unique role in maintaining the ecosystem's balance. Each species is adapted to its environment in unique ways, which explains their differences in appearance and behavior. For example, plants in deserts have evolved to store water in their leaves, while animals in cold regions have thick fur to keep them warm.

Plants Diversity

Plants exhibit a wide range of characteristics that help us group and study them more effectively. These characteristics often relate to the stems, leaves, flowers, and more. For example, the thickness, height, and hardness of stems can vary greatly among different plants, while the shape, color, size, and arrangement of leaves can differ widely. This diversity allows plants to adapt to various environments and fulfill specific ecological roles. A practical way to study plants is by categorizing them based on their height and structural features, such as their stems and branching patterns.



Categorization of Plants Based on Their Height



Herbs are small plants with soft, green, and tender stems. They are usually short and lack branches. Examples include coriander, mustard, wheat, and paddy. Herbs are often used for food, medicine, and decoration.



Shrubs are medium-sized plants with woody stems. They have branches that grow close to the ground, giving them a bushy appearance. Examples include rose, china rose, lemon, and tomato. Shrubs are often grown for their fruits, flowers, or ornamental value.



Trees are tall plants with thick, hard, and woody stems called trunks. Their branches grow high above the ground, forming canopies. Examples include neem, mango, peepal, and jamun. Trees are vital for providing oxygen, shade, and habitats for various species.

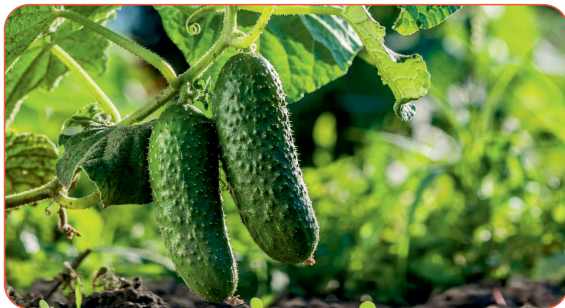
Plants can be categorized based on their stem strength

Plants can be categorized based on their stem strength into creepers and climbers. These plants have weak stems and rely on external support or grow along the ground.

Creepers: Creepers grow horizontally along the ground because their stems are too weak to stand upright. They produce large fruits or flowers and spread to distribute their weight evenly. Examples include **Strawberry and Sweet Potato**.



Climbers: Climbers grow vertically with the help of nearby supports such as walls, fences, or branches. They use **tendrils** or twining stems to attach themselves and climb upwards. Examples include the **Cucumber and Pea Plant**.



This classification helps us understand how plants adapt their growth to suit their environment.

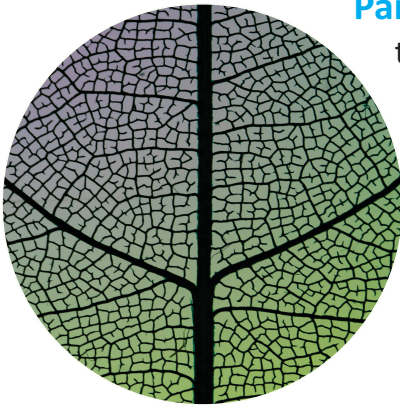
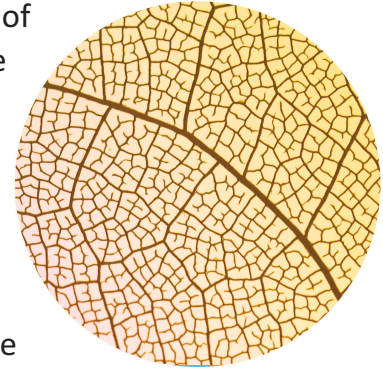
Plants Based on Their Venation

The pattern of veins on leaves is called venation, and it plays a vital role in transporting water, nutrients, and food within the leaf. Based on the arrangement of veins, leaves can be categorized into two types: reticulate venation and parallel venation.

KEYWORDS

Tendrils: Tendrils are slender, coiling structures that plants use for support, attachment, or climbing. They are often found in climbing plants like peas, grapevines, and passionflowers, enabling them to secure themselves to nearby structures.

Reticulate Venation: Reticulate venation forms a net-like pattern of veins on both sides of the central vein, known as the midrib. The smaller veins branch out irregularly, creating a web-like structure. This type of venation is commonly seen in dicot plants. Examples include the leaves of rose and China rose.



Parallel Venation: In parallel venation, the veins run parallel to each other along the length of the leaf. Unlike reticulate venation, the veins do not branch out, and this pattern is typical in monocot plants. Examples include the leaves of banana and grasses.

These types of venation not only help in identifying plants but also reflect their adaptations to different environments. Reticulate venation provides structural support, while parallel venation ensures efficient nutrient transport in narrow leaves.

Plants classified based on their root systems

Plants can be classified based on their root systems into two types: **Taproots** and **Fibrous roots**. Each type plays a unique role in the plant's growth and adaptation to its environment.



Taproots: Taproots consist of a single, thick main root that grows deep into the soil, with smaller side roots branching off from it. This type of root is common in dicot plants and is excellent for anchoring the plant and accessing water and nutrients from deeper soil layers. Examples of plants with taproots include China rose and carrot.

Fibrous roots: It form a cluster of thin, thread-like roots of similar size that spread out from the base of the stem. These roots are typically found in monocot plants and are highly efficient in preventing soil erosion and quickly absorbing surface water. Examples include **Sugarcane and Grass**.

Understanding these root systems helps us appreciate how plants adapt to their environment. Taproots are suited for stability and deep water access, while fibrous roots are effective for holding soil together and thriving in areas with shallow water.



Plants categorized based on the seed leaves and seeds

Plants can also be categorized based on the number of cotyledons, or seed leaves, present in their seeds. This leads to two classifications: **Monocotyledons (Monocots)** and **Dicotyledons (Dicots)**.



Seeds have one cotyledon

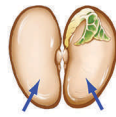


Leaves are narrow, with parallel veins



Fibrous roots

Monocotyledons (Monocots): Monocots are plants with seeds that contain a single cotyledon. These plants are characterized by having parallel venation in their leaves and a fibrous root system. Monocots are typically found in grasses and cereal crops, making them essential for agriculture. Examples of monocots include maize and rice.



Seeds have two cotyledons



Leaves are oval or palmate, with net-like veins



Tap roots

Dicotyledons (Dicots): Dicots are plants with seeds that have two cotyledons. They are distinguished by reticulate venation in their leaves and a taproot system. Dicots include a wide variety of plants, many of which produce fruits, vegetables, or legumes. Examples of dicots include chickpea, pea and rice.

This classification not only highlights the structural differences in seeds but also helps in understanding the growth patterns and adaptations of plants. **Monocots** are ideal for quick water absorption with shallow roots, while **dicots** benefit from deeper anchorage and nutrient storage.

Animal Diversity

Animals exhibit remarkable diversity in their size, shape, movement, and behavior. This diversity allows them to adapt to different environments and perform specific roles in ecosystems. For example, some animals, like lions, are large and powerful, while others, like squirrels, are small and agile. Similarly, some animals fly through the air, like birds, while others swim in water, such as fish. This variety showcases the adaptability and uniqueness of the animal kingdom.

Understanding Local Names of Animals

Animals are often known by different names in various regions, reflecting cultural and linguistic differences. A local name refers to the commonly used term for an animal in a specific language or area. For example, a sparrow might be called by a unique name in one place and a different name elsewhere. Recognizing these names helps connect people with their local biodiversity and fosters a deeper understanding of the natural world.

KEYWORDS

Monocots: Plants with seeds that have a single cotyledon.

Dicots: Plants with seeds that have two cotyledons.

Where Do Animals Usually Live?

Animals live in a variety of habitats, which are the specific environments that provide them with the resources they need to survive. Some animals live on land, such as forests, fields, or deserts, where they can find food, water, and shelter. Others reside in aquatic habitats, such as rivers, ponds, or oceans, where they are adapted to swim or float. Birds and certain insects inhabit the air, building nests in trees or flying vast distances. The habitat of an animal reflects its unique **adaptations** and survival needs.

What Kind of Food Does This Animal Need to Stay Healthy?

The diet of an animal is crucial for its growth, energy, and overall health. Different animals have different diets based on their species and habitat. Herbivores eat plants, such as grass or leaves, while carnivores feed on meat or insects. Omnivores consume a combination of plants and animals. Understanding an animal's diet helps in knowing how it interacts with its environment and maintains its role in the ecosystem. For example, a rabbit eats grass to stay healthy, while a lion relies on meat.

How to Group Animals Based on Movement

Animals use different types of movement to travel from one place to another, depending on their body structure and the environment they live in. Each mode of movement involves specific body parts that are adapted for the task. Here are some common types of movement in animals:

- **Walking:** Animals such as goats, humans, cows, and lions move by walking, using their legs for support and movement.
- **Jumping:** Animals like kangaroos, monkeys, and frogs use their strong legs to jump and cover distances.
- **Flying:** Birds, houseflies, and bees rely on their wings to fly, allowing them to navigate the air.
- **Swimming:** Aquatic animals such as fish, whales, and dolphins use fins to swim through water.
- **Crawling:** Creatures like crabs, lizards, and caterpillars move by crawling, often using their legs or body muscles.
- **Climbing:** Animals such as monkeys, squirrels, and koalas climb trees and surfaces using both their hands and legs.

SWIM



WALK



CRAWLING



KEYWORDS

Adaptation: It is the ability to adjust and thrive in changing environments or circumstances. It is a key trait that ensures survival, growth, and success in dynamic conditions.

Importance of Grouping Animals

In addition to movement, animals can also be classified based on features like size, shape, and color. Categorizing animals helps us understand their diversity and how they adapt to different habitats. It also highlights the unique roles they play in their ecosystems, emphasizing the importance of their survival and conservation. Understanding animal movement provides insight into their physical characteristics and how they interact with their environment.



Did you know

Janaki Ammal

Janaki Ammal (1897–1984) was a renowned Indian botanist who made significant contributions to environmental conservation and biodiversity research. Her work focused on documenting and preserving India's rich plant diversity. She played a crucial role in the Save Silent Valley movement, which aimed to protect Kerala's Silent Valley forest from being destroyed by a hydroelectric project.



As the director of the Botanical Survey of India, Janaki Ammal spearheaded programs to classify and conserve the diverse plant species of the country. Her efforts in both scientific research and environmental activism have left a lasting impact on India's conservation history.

Let's recall what we know

Apply Concept in Real-Life Context

Apply

1. Provide two examples of plants that show both taproot and fibrous root systems.
2. How does the type of root system relate to the plant's habitat or environment?

Skills Covered: Critical and logical thinking, Brainstorming, Applicative thinking

Examine Further

Analyse

1. Research examples of how animals adapt their movement based on their habitat.
2. What are the key physical traits that help distinguish aquatic animals from terrestrial animals? Explain.
3. List some examples of plants or animals that can survive in extreme environments, like deserts or polar regions

Skills Covered: Critical and logical thinking, Brainstorming, Applicative thinking, Research

SCAN TO ACCESS



Take a Task



Watch Remedial

**Bloom's
Taxonomy**

Self-Assessment Questions

Evaluate

1. Define adaptation and explain its importance in biodiversity.
2. Differentiate between climbers and creepers with examples.
3. Give examples of monocot plants and dicot plants.
4. List two differences between fibrous roots and taproots.
5. Which body parts are used by animals that can swim?

Skills Covered: Evaluation, Logical thinking

Creative Insight

Create

List ten animals and ten plants from your surroundings. Categorize the plants based on their root type (taproot/fibrous) and their venation (parallel/reticulate). Also, classify the animals based on their movement type and feeding habits. Present this information in a creative chart or table for the class.

Skills Covered: Creativity, Critical and logical thinking, Brainstorming, Observation, Organization

Plants and Animals in Different Surroundings

Aarav and Maya are walking through a forest trail, observing plants and animals in different surroundings.

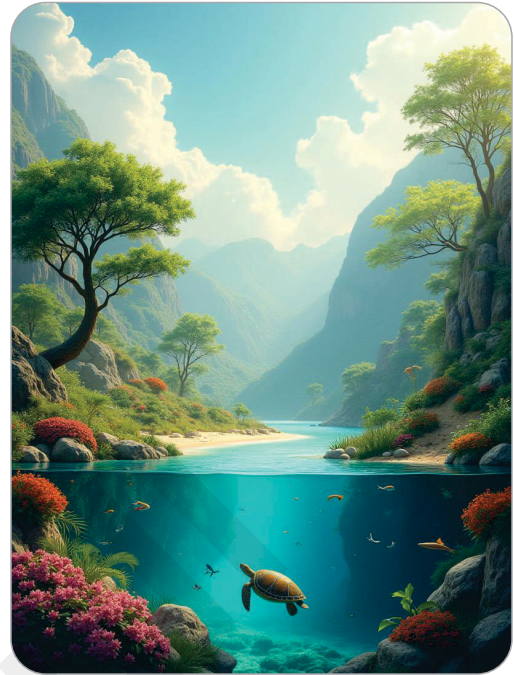


All living organisms, including plants and animals, need food, shelter, and essential **resources** like oxygen and water from their surroundings to survive. A habitat is the natural **environment** where organisms live and thrive. It provides everything they need, including food, shelter, and suitable climatic conditions.

For example, sea turtles find their habitat in oceans, camels are adapted to survive in hot or cold deserts, and rhododendrons grow in mountainous regions. Many plants and animals can coexist within the same habitat by sharing resources. Habitats play a crucial role in shaping the biodiversity of a region, as they support the survival of diverse species.

Protecting biodiversity is essential to maintaining life on Earth. By preserving natural habitats and ensuring plants and animals can thrive, we can help safeguard the rich variety of life that our planet supports. This makes habitat conservation a critical step in sustaining biodiversity for future generations.

Plants and animals can be broadly classified into two types based on the habitat in which they live: **terrestrial habitats and aquatic habitats**. These habitats provide the necessary resources and conditions for the survival and growth of living organisms. Each type of habitat is unique and supports a variety of species that have adapted to thrive in those specific environments.



Terrestrial Habitat

Terrestrial habitats are land-based environments where organisms live and interact with the land, air, and other elements of their surroundings. These habitats include forests, grasslands, deserts, and mountains. Plants and animals in terrestrial habitats have adaptations that help them survive the challenges of the land, such as fluctuating temperatures, varying availability of water, and specific soil types.



KEYWORDS

Resources: Resources are materials, energy, or services used to support human activities and fulfill needs, including natural, human, and capital resources.

Environment: The environment encompasses all living and non-living elements surrounding us, including air, water, land, and ecosystems, which influence and support life on Earth.

For Example



Lions and elephants in grasslands have adaptations like strong limbs and keen senses to hunt or protect themselves.



Pine trees and mountain goats are well-suited to cold, high-altitude mountain regions where temperatures are lower and the terrain is rugged.



Cactus are adapted to deserts with their thick stems to store water and spines to reduce water loss.

Aquatic Habitat

Aquatic habitats are water-based environments, including oceans, rivers, lakes, and ponds. These habitats are home to organisms that are specially adapted to live and move in water. For instance:

Fish have fins for swimming and gills for breathing underwater.

Sea turtles live in the ocean but come to land to lay eggs, showcasing their ability to adapt to both water and land.

Algae and seaweeds thrive in oceans and provide food and oxygen for aquatic animals.

Aquatic habitats also vary significantly, from the salty waters of oceans to the fresh waters of rivers and lakes. Each type of aquatic habitat supports its own unique biodiversity. For example, coral reefs in oceans are often referred to as the "rainforests of the sea" because of the incredible variety of species they host.

The Connection Between Habitat and Biodiversity

Both terrestrial and aquatic habitats play a vital role in supporting biodiversity. A habitat provides food, shelter, and proper climatic conditions essential for the survival of organisms. Many plants and animals share the same habitat and depend on each other for survival, forming complex ecosystems.

For example, in a forest (a terrestrial habitat), trees provide shelter and food for birds, while insects pollinate plants, and herbivores feed on leaves. Similarly, in a pond (an aquatic habitat), fish feed on smaller aquatic organisms, and plants like water lilies provide oxygen and shelter.

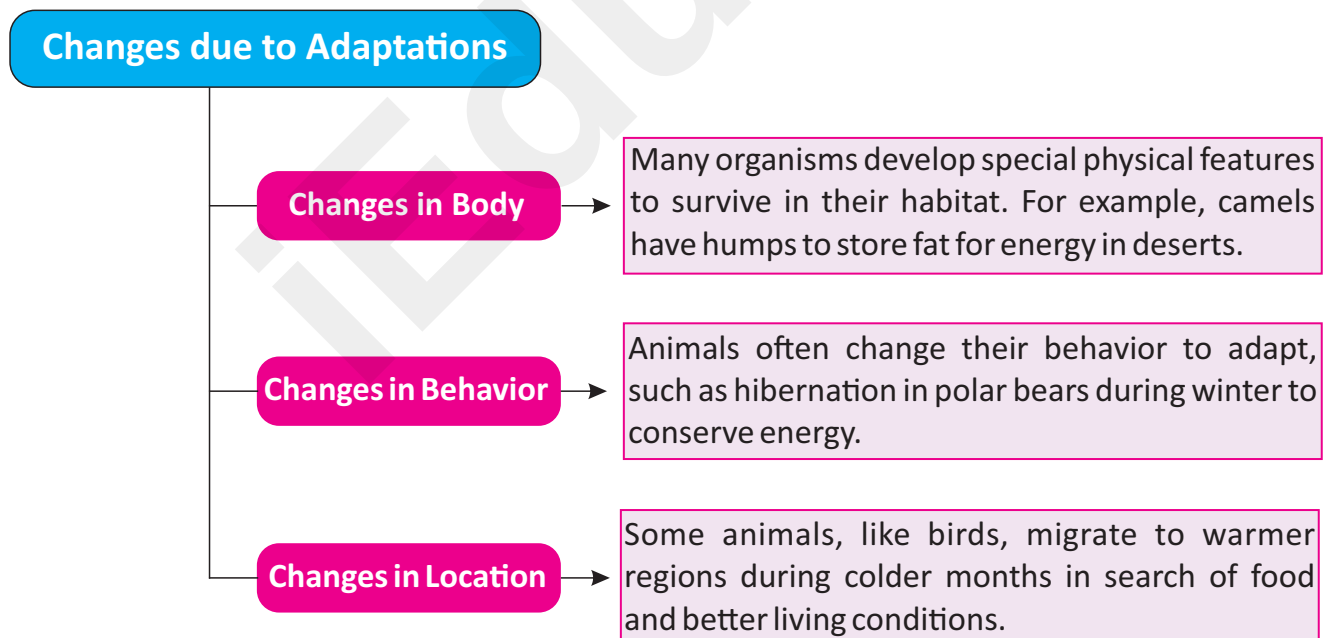
Protecting Habitats to Preserve Biodiversity

Habitat loss due to human activities like deforestation, pollution, and urbanization is one of the biggest threats to biodiversity. Protecting terrestrial and aquatic habitats is crucial to ensure the survival of the wide variety of plants and animals that depend on them. Conservation efforts like creating wildlife reserves, protecting coral reefs, and reducing pollution help maintain the balance of ecosystems. By preserving habitats, we can ensure that the Earth remains rich in biodiversity for future generations.



Adaptation

Plants and animals living in different habitats have unique features and behaviors that help them survive. This ability to adjust and thrive in a specific environment is called adaptation. Adaptations involve physical features, behaviors, or movements that suit the organism to its surroundings, such as their shape, size, color, and structure.



Adaptations in Deserts

Deserts are harsh environments with extreme heat during the day, cold temperatures at night, and minimal rainfall. Organisms here have evolved specific adaptations to survive in these challenging conditions.

Adaptations in a Cactus

Cacti are excellent examples of plants adapted to desert life:

- ✦ **Spines instead of Leaves:** The leaves of cacti are modified into spines to minimize water loss through transpiration.
- ✦ **Green, Spongy Stems:** The stem is thick and spongy to store water and also performs photosynthesis.
- ✦ **Long Roots:** Cacti have long roots that grow deep into the soil to absorb water from underground sources.



Adaptations in a Camel

Camels are well-adapted to survive in harsh desert conditions. Their physical features and behaviors enable them to endure extreme heat, scarce water, and sandy environments. Here are some key adaptations found in camels:

- ✦ **Body Color:** Camels have a brown-colored body that blends with the desert surroundings, helping them avoid predators.
- ✦ **Long Eyelashes and Closable Nostrils:** Their long eyelashes shield their eyes from sandstorms, and they can close their nostrils to prevent sand from entering their nasal cavity.
- ✦ **Hump for Fat Storage:** The camel's hump stores fat, which serves as a source of energy, allowing them to survive for months without food.
- ✦ **Long Legs:** Camels have long legs that keep their body elevated, protecting them from the hot sand.
- ✦ **Water Conservation:** Camels do not sweat and produce minimal urine and dung, conserving water for longer periods.
- ✦ **Low Breathing Rate:** They have a slow breathing rate, reducing water loss through exhalation.
- ✦ **Water Storage:** Camels can drink large amounts of water in one sitting and store it in their bodies for future use.
- ✦ **Thick Lips:** Their thick and tough lips enable them to eat thorny desert plants like cacti without injury.
- ✦ **Wide Padded Feet:** Their broad, well-padded feet and wide hooves help them walk on hot, soft sand without sinking.

Camels living in colder areas, such as Ladakh, have distinct adaptations. They have shorter legs to navigate mountainous terrain and two humps for better fat storage. During harsh winters, their body shrinks, and they rely on the stored fat for energy. Additionally, they grow long, thick hair to protect them from the extreme cold.

These adaptations enable camels to thrive in different environments, showcasing their remarkable ability to survive and flourish in both hot deserts and cold regions.



Adaptations in Mountain Plants

Mountain habitats pose extreme challenges with cold temperatures, strong winds, snow-covered ground, and limited food availability. Despite these conditions, plants and animals have evolved unique adaptations to thrive in these environments. Species such as mountain goats, yaks, snow leopards, and plants like pine, fir, and rhododendrons exhibit remarkable features that help them survive in harsh mountainous regions.



Mountain plants face challenges like freezing temperatures, heavy snowfall, and strong winds. Here are some adaptations that allow them to survive:

Conical Shape and Tall Growth:

Trees like pine and fir have a conical shape, enabling snow to slide off their branches easily. This minimizes the risk of branch breakage and reduces wind resistance.

Thick Bark:

The thick, sturdy **bark** of mountain trees provides insulation, protecting the plant's internal structures from the cold.

KEYWORDS

Bark: The tough, protective outer covering of the stem or trunk of a plant, which shields the inner tissues from damage, pests, and environmental stress.

Insulation: The process or material that prevents or reduces the transfer of heat, sound, or electricity, in plants.

Needle-shaped Leaves with Waxy Coating:

Leaves of mountain trees are narrow and coated with wax to reduce water loss. Their shape also prevents snow from accumulating and allows wind to pass through.

Cones Instead of Flowers:

These trees produce cones that protect seeds from freezing temperatures, ensuring their reproduction.

Evergreen Nature:

Plants like fir and cedar remain green year-round, allowing them to perform photosynthesis even during winter.

Rhododendrons' Adaptability:

- ✦ In the Shola Forests of Nilgiri, rhododendrons are short with small leaves to endure strong winds.
- ✦ In Sikkim, they grow taller in less windy conditions, showing regional adaptability.

Adaptations in Mountain Animals

Thick Fur and Fat Layers: Animals like yaks and polar bears have thick fur and fat layers to retain body heat and provide insulation against freezing temperatures.

Adapted Feet and Hooves:

- ✦ Mountain goats have strong hooves with rubbery pads for better grip on rocky slopes.
- ✦ Polar bears have padded feet to walk on snow and ice without slipping.

Feeding Adaptations: Herbivores like yaks use their horns to dig through snow and access grass.

Camouflage: Animals like snow leopards and mountain goats have white or patterned fur that blends with their snowy environment, helping them avoid predators.



Mountain Goat



Yak



Snow Leopard

Specific Animals:

- ✦ **Mountain Goats:** Strong hooves, thick white fur, and the ability to leap long distances help them navigate steep slopes and evade predators.
- ✦ **Yaks:** Dense fur and strong bodies enable them to survive freezing conditions. Their horns help them dig through snow for food.
- ✦ **Snow Leopards:** Thick, patterned fur provides warmth and camouflage, while their long, bushy tails help with balance and serve as blankets when resting.

Adaptations in Ponds, Lakes, and Rivers:

Freshwater ecosystems like ponds, lakes, and rivers provide vital resources but also present challenges such as fluctuating water levels, currents, and oxygen availability. Plants and animals in these habitats have developed specific adaptations to survive.



Adaptations in Freshwater Plants

Reduced Roots:

Freshwater plants have small roots, as they don't need extensive systems to absorb water. Instead, their roots anchor them in place.

Long, Hollow, Flexible Stems:

Stems of freshwater plants are lightweight and flexible, allowing them to move with water currents without breaking.

Leaf Adaptations:

- ✦ **Submerged Plants:** Thin, ribbon-like leaves (e.g., Hydrilla) reduce resistance to water currents.
- ✦ **Floating Plants:** Broad, wax-coated leaves (e.g., water lilies) repel water and help plants float.

Air Spaces for Buoyancy:

Floating plants like lotuses have air-filled spaces in their leaves and stems, enabling them to float.

Efficient Photosynthesis:

Floating plants have wide leaves to capture sunlight, while submerged plants absorb nutrients and gases directly from the water.



Examples of Freshwater Plants

- ✦ **Hydrilla:** Fully submerged with simple, narrow leaves.
- ✦ **Water Lily:** Floats on the surface with broad leaves.
- ✦ **Lotus:** Waxy leaves and stems help it thrive on water.



Hydrilla



Water Lily



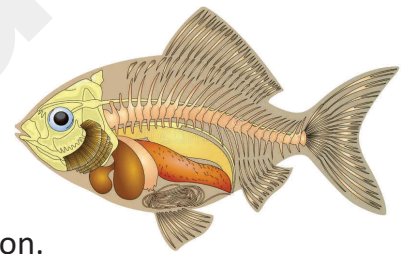
Lotus

Adaptations in Freshwater Animals

Animals in freshwater habitats are equipped to navigate water, breathe, and feed effectively.

Fish

- ✦ **Streamlined Body:** Reduces water resistance.
- ✦ **Fins:** Help with steering and propulsion.
- ✦ **Gills:** Extract dissolved oxygen from water.
- ✦ **Scales and Mucus:** Protect against infections and reduce friction.



Frogs

- ✦ **Webbed Feet:** Aid in swimming.
- ✦ **Dual Respiration:** Frogs use lungs on land and moist skin underwater.
- ✦ **Strong Hind Legs:** Enable long jumps to catch prey.
- ✦ **Sticky Tongue:** Helps catch insects and small prey.



Examples of Freshwater Animals

- ✦ **Fish:** Carps, catfish, and trout are streamlined for swimming.
- ✦ **Frogs:** Adapted for both land and water.
- ✦ **Insects:** Water beetles and newts are adapted for swimming and extracting oxygen.

Adaptations in Oceans and Seas

Oceans and seas are saline water ecosystems with challenges like high salinity, immense depths, and limited oxygen. Marine plants and animals have evolved specialized features to survive.

Adaptations in Marine Plants

Algae (Phytoplankton and Seaweeds):

- **Phytoplankton:** Small, photosynthetic organisms that float near the surface and form the base of the marine food chain.
- **Seaweeds:** Larger algae that perform photosynthesis and thrive in saline water.



Holdfasts:

Seaweeds use root-like holdfasts to anchor themselves to rocks, preventing them from being swept away by waves.

Flexible Fronds:

Long, flexible structures move with water currents, reducing damage.

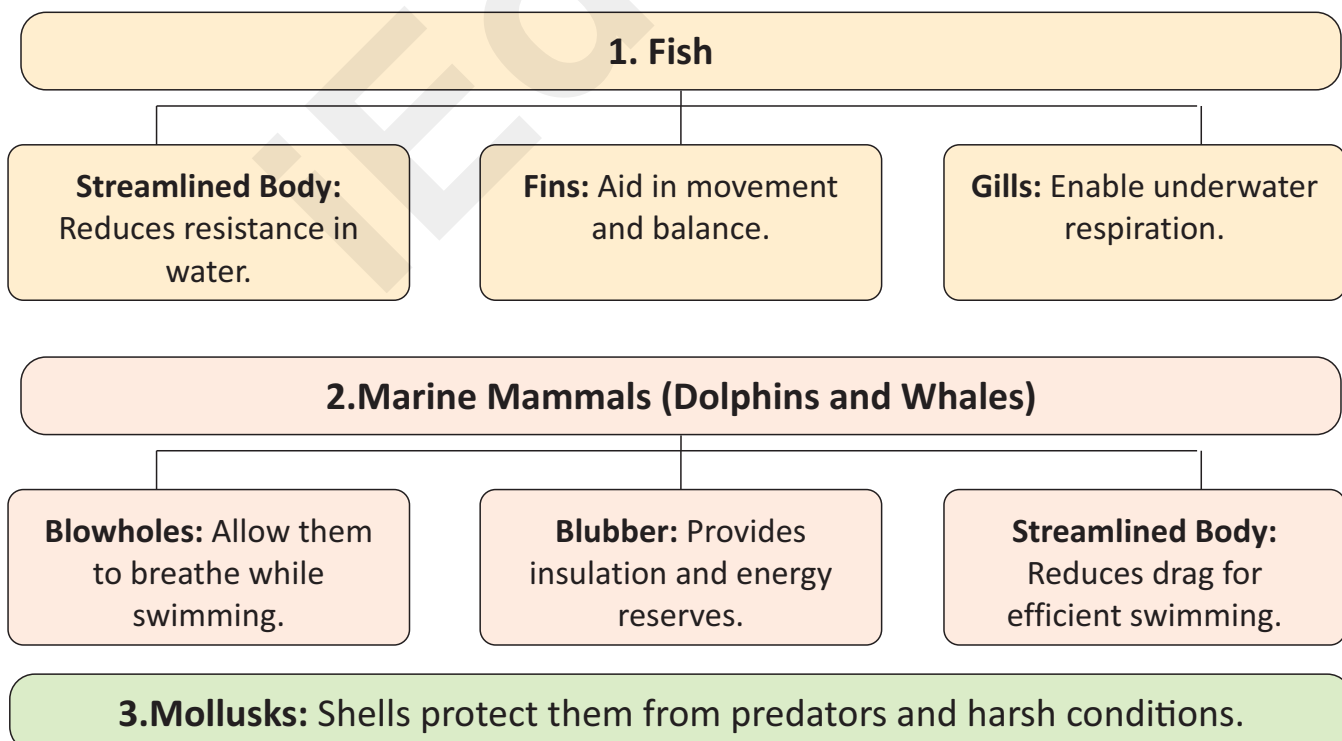
Air Sacs for Buoyancy:

Some marine plants have gas-filled sacs to float near the water's surface for sunlight exposure.

Salt Tolerance:

Marine plants cope with high salinity by storing or excreting excess salt.

Adaptations in Marine Animals



4. Sea Anemones: Use tentacles to capture prey like small fish and plankton.

5. Adaptations for Depth: Deep-sea animals often have bioluminescence to communicate or hunt in darkness.

Examples of Marine Animals

- **Dolphins and Whales:** Use blowholes for breathing and echolocation for navigation.
- **Fish:** Adapted with gills and fins for efficient swimming.
- **Crabs and Starfish:** Adapt to varying salinity and depth.

Let's recall what we know

Apply Concept in Real-Life Context

Apply

1. Why do animals in cold regions often have thick fur, while those in hot deserts have thin coats or no fur?
2. What would happen if a desert plant, like a cactus, were placed in a rainforest? Would it survive? Why or why not?

Skills Covered: Critical and logical thinking, Brainstorming, Applicative thinking, Research

Examine Further

Analyse

1. How does the destruction of forests affect the animals that live there?
2. Investigate how frogs are able to live both on land and in water. What adaptations help them survive in these two environments?
3. What makes mountain goats better adapted to rocky and steep terrains compared to other animals?

Skills Covered: Critical and logical thinking, Brainstorming, Applicative thinking, Research

Self-Assessment Questions

Evaluate

1. Name two adaptations that help polar bears survive in cold climates.
2. How do desert plants survive with little or no rainfall?
3. Explain how mountain plants protect themselves from strong winds and low temperatures.

Skills Covered: Evaluation, Critical thinking, Logical reasoning

SCAN TO ACCESS



Take a Task



Watch Remedial

**Bloom's
Taxonomy**

SUMMARY



The diversity in the living world highlights the vast variety of plants and animals found across different habitats. This diversity is essential for maintaining ecological balance and supporting life on Earth. The study of biodiversity focuses on the differences in size, structure, movement, and behavior of living organisms and how they adapt to their environments.

Diversity in Plants and Animals Around Us

Plants and animals vary significantly based on their traits and habitats:

- **Plants:** Classified based on characteristics like height (herbs, shrubs, and trees), stem strength (creepers and climbers), venation (reticulate and parallel), root systems (taproots and fibrous roots), and seed types (monocots and dicots). Examples include herbs like coriander, trees like neem, and monocots like rice.
- **Animals:** Display a wide range of movement patterns such as walking (goats), swimming (fish), flying (birds), and jumping (frogs). They adapt to their surroundings using traits like body size, camouflage, and diet. Local names often reflect cultural ties to animals, promoting a deeper understanding of biodiversity.

Plants and Animals in Different Surroundings

Living organisms adapt to their surroundings, which include terrestrial and aquatic habitats:

- **Terrestrial Habitats:** Found on land, including deserts, mountains, and forests. Examples include camels with adaptations like humps to survive in deserts and mountain goats with strong hooves for navigating rocky terrain.
- **Aquatic Habitats:** Include freshwater (ponds, lakes, rivers) and marine environments (oceans and seas). Freshwater plants like Hydrilla have narrow leaves, while marine

plants like seaweed use holdfasts for anchoring. Animals such as dolphins breathe through blowholes, and fish have gills and streamlined bodies for efficient swimming.

Adaptations

Adaptations allow organisms to survive and thrive in their specific environments:

Deserts: Camels and cacti conserve water through features like humps and spines.

Mountains: Plants like pine trees are conical to shed snow, and animals like snow leopards use thick fur for warmth.

Freshwater: Frogs use webbed feet and moist skin for dual respiration, while plants like water lilies float using air-filled stems.

Oceans: Marine animals like dolphins use streamlined bodies for swimming, and deep-sea creatures use bioluminescence for survival in dark depths.

Conservation of Biodiversity

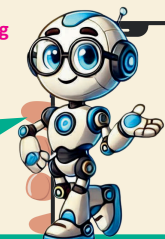
The interdependence of plants and animals within ecosystems emphasizes the need to conserve habitats and protect biodiversity. Efforts like reducing deforestation, pollution, and habitat destruction ensure the survival of diverse species, which are vital for maintaining Earth's ecological balance.

EeeBee: Your AI Buddy

Explore! **Diversity in the Living World** with EeeBee AI Buddy.

Hi Friend! Use prompts to ask me questions about the chapter we just finished! eeee, lets go!

Start by Scanning this QR Code:





Gap Analyzer™
Take a Test



EXERCISE

That turn curiosity into confidence—let's begin!



A. Choose the correct answer

- What is the reason for the great diversity in plants and animals?
(a) Uniform climate ☐ (b) Varied habitats ☐
(c) Limited resources ☐ (d) Lack of evolution ☐
- Which of the following animals is best adapted to desert life?
(a) Polar bear ☐ (b) Camel ☐
(c) Frog ☐ (d) Penguin ☐
- Mangrove trees are typically found in which type of environment?
(a) Desert ☐ (b) Mountains ☐
(c) Coastal wetlands ☐ (d) Grasslands ☐
- Why do aquatic plants have thin and flexible stems?
(a) To attract insects ☐ (b) To survive strong water currents ☐
(c) To store food ☐ (d) To grow faster ☐
- Which is an example of an adaptation in animals?
(a) Trees shedding leaves ☐ (b) Camouflage in chameleons ☐
(c) Flowers blooming ☐ (d) Roots absorbing water ☐

B. Fill in the blanks

- Animals like _____ use camouflage to protect themselves from predators.
- Aquatic plants have _____ leaves to help them float.
- Desert animals such as camels store water in their _____ to survive in harsh conditions.
- The diversity in living organisms is largely influenced by their _____ surroundings.
- Plants in hilly areas often have needle-shaped leaves to prevent _____ loss.

C. Write True or False

- Grassland animals have adaptations to hide from predators. _____
- All plants and animals can survive in any environment. _____
- Polar bears have thick fur and fat layers to stay warm in icy surroundings. _____
- Cacti have deep roots to absorb water from the soil. _____
- All aquatic animals have lungs for breathing. _____

D. Define the following terms

1. Diversity
2. Adaptation
3. Habitat
4. Camouflage
5. Ecosystem

E. Match the columns

Column - A

1. Desert plants
2. Aquatic animals
3. Mountain plants
4. Mangrove trees
5. Polar animals

Column - B

- (a) Needle-like leaves
- (b) Wetland habitats
- (c) Water storage in stems
- (d) Gills for respiration
- (e) Thick fur and fat

F. Give reasons for the following statements

1. Animals and plants develop unique adaptations based on their surroundings.
2. Camouflage is important for survival in some animals.
3. Aquatic plants have floating leaves and flexible stems.
4. Desert animals can survive with very little water.
5. Mountain plants grow close to the ground in harsh climates.

G. Answer in brief

1. Why do animals in polar regions have thick fur and fat layers?
2. How do plants in deserts survive without much water?
3. What is the importance of diversity in plants and animals?
4. Describe how mangrove plants survive in waterlogged soil.
5. Why do grassland animals often have long legs or strong muscles?

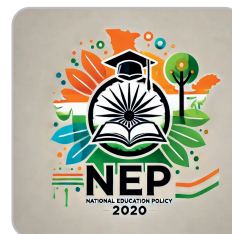
H. Answer in detail

1. Explain the importance of biodiversity and how it supports life on Earth.
2. Describe the adaptations found in desert plants and animals.
3. How do animals in aquatic environments survive and thrive?
4. Discuss the role of different habitats in creating plant and animal diversity.
5. Compare the characteristics of plants and animals in tropical rainforests and polar regions.



**Study What You Love!**

You can now choose subjects across streams. Like Math and Music together? It's possible under NEP 2020!



Skill-based Activity

**Curious Minds at Work****STEM**

Observe your surroundings and identify one unique adaptation in a plant or animal. Write a question about how this adaptation helps in its survival. Using the scientific method, describe the steps you would take to answer your question.

Skills Covered: Critical and logical thinking, Brainstorming, Analytical thinking, Problem-solving, Curiosity, Observation, Decision-making skills

Flavors of Nature**Art**

Identify and sketch a plant or animal unique to your local region. Write a short description of its habitat, diet, and adaptations that help it survive. Present your work to the class.

Skills Covered: Creativity, Critical and logical thinking, Applicative thinking

Diversity in Action**Group Activity**

In groups, investigate how different animals in your local surroundings are adapted to survive. Create a chart categorizing these animals based on their habitats and present it to the class.

Skills Covered: Critical and logical thinking, Brainstorming, Teamwork, Communication, Applicative thinking, Decision-making skills

Technology in Focus**Case to Investigate**

Explore and research how scientists use technology like drones or underwater cameras to study the diversity of life in hard-to-reach habitats like rainforests or deep oceans. Write a short report on your findings.

Skills Covered: Critical and logical thinking, Brainstorming, Research, Applicative thinking

Sustainability Spotlight

Aligning with SDGs

Research a conservation program aimed at protecting a specific plant or animal species. Highlight its key features and how it aligns with sustainable development goals. Present your findings to the class.

Aligned with: SDG 15 – Life on Land, SDG 14 – Life Below Water

Skills Covered: Critical and logical thinking, Brainstorming, Research, Problem-solving, Ethics

Mapping Diversity

Integrated Learning

Using the Internet, create a map of India showing the regions where specific animals like tigers, elephants, or snow leopards are found. Explain how the climate and geography of these areas support these animals.

Integrated Learning: Geography

Skills Covered: Critical and logical thinking, Brainstorming, Analytical thinking, Applicative thinking